



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,368	10/21/2003	Mark Alan Lysinger	03-C-041	6555

7590 02/22/2006

Lisa K. Jorgenson
STMicroelectronics, Inc.
1310 Electronics Drive, MS 2346
Carrollton, TX 75006-5039

EXAMINER

LAM, DAVID

ART UNIT	PAPER NUMBER
----------	--------------

2827

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/690,368

Applicant(s)

LYSINGER, MARK ALAN

Examiner

David Lam

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/15/05.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 21-30 is/are allowed.
- 6) ☒ Claim(s) 1, 9, 14-15, 17, 19, 31, 34-36 is/are rejected.
- 7) ☒ Claim(s) 2-8, 10-13, 16, 18, 20, 32-33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Respond to Amendment

1. This office action is in response to the amendment file on 12/5/05.
 - Claims 34-36 are newly added;
 - Claims 1-36 are pending in the application.

Claim Objections

2. Claim 11 objected to because of the following informalities: in claim 11, line 5; "signal" should be change to --signals --. Appropriate correction is required

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 9, 31, 34-35 are rejected under 35 U.S.C. 102(e) as being anticipated by Ao (6,987,683)

Regarding to claims 1, 9, Ao discloses a magnitude content addressable memory (MCAM) comprising a plurality of MCAM cells, wherein the plurality of MCAM cells comprises: a first memory cell (9) for storing a data value (11) and a magnitude comparator (13 or 100 or 166) coupled to the first memory cell and operable to receive a comparison value

Art Unit: 2827

(output of 7) and the data values (output of 11) as inputs to produce first and second magnitude signal ($A > B$, $A < B$) as outputs; wherein the first magnitude signal indicates if the comparison value is greater than the data value ($A > B$) and the second magnitude signal indicates if the comparison value is less than the data value ($A < B$); wherein the plurality of MCAM cells are configured as at least one MCAM cell group (10) having a series arrangement, and wherein the comparator of an MCAM cell in the at least one group is responsive to the first and second magnitude signals (193, 195) of preceding MCAM cell in the series arrangement. *See at least Figs. 1-3; for example Cols. 5-8; lines 58-67, 1-67, 1-67; 1-38, respectively, and the related disclosure.*

Regarding to claim 31, Ao discloses a magnitude content addressable memory (MCAM) comprising a plurality of MCAM cells, wherein a cell of the plurality of MCAM cells comprises: a first memory cell (9) for storing a data value (11); and comparison means (13 or 100 or 166), coupled to the first memory cell and operable to receive a comparison value (output of 7) and the data value (output of 11) as inputs, for generating first and second magnitude signals ($A > B$, $A < B$) as outputs; wherein the first magnitude signal indicates if the comparison value is greater than the data value ($A > B$) and the second magnitude signal indicates if the comparison value is less than the data value ($A < B$). *See at least Figs. 1-3; for example Cols. 5-8; lines 58-67, 1-67, 1-67; 1-38, respectively, and the related disclosure.*

With regard to claims 34-35, Ao discloses a magnitude content addressable memory (MCAM) comprising a plurality of MCAM cells, wherein the first cell of the plurality of MCAM

Art Unit: 2827

cells comprises a memory cell (9) for storing a data value (11); a magnitude comparator (13 or 100 or 166) coupled to the first memory cell and operable to generate an output magnitude signal dependent upon a comparison value (output of 7), the data value (output of 11) and a previous magnitude signal (169 or 171); wherein the previous magnitude signal is generated by a second cell of the plurality of MCAM cells and wherein the output magnitude signal is asserted if the comparison valued is greater than the data value ($A > B$) and the previous magnitude signal is asserted; wherein the plurality of MCAM cells are arranged in series. *See at least Figs. 1-3; for example Cols. 5-8; lines 58-67, 1-67, 1-67; 1-38, respectively, and the related disclosure.*

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ao (6,987,683) in view of Schultz et al. (5,995,401).

Ao disclose all the elements as applied to claim 1 above.

Ao fail to specify wherein the first memory is an SRAM comprising a write line coupled to the SRAM; a first bit line couple to the SRAM for carrying a true data signal to be stored in the SRAM; and a second bit line coupled to the SRAM for carrying a complementary data signal to be stored in the SRAM.

Art Unit: 2827

Schultz et al. disclose a content addressable memory (CAM) comprising a first memory is an SRAM (210) and further comprises a write line (Figure 5) coupled to the SRAM; a first bit line (bl or bl0) couple to the SRAM for carrying a true data signal to be stored in the SRAM; and a second bit line (bln or bl0) coupled to the SRAM for carrying a complementary data signal to be stored in the SRAM.

It would have been obvious to one having ordinary skill in the art at the time of the invention to form Ao' CAM device with all the above limitations as taught by Schultz in order to reduce cost, highly efficiency, highly reliability semiconductor memory device.

5. Claims 17, 19, 36 are rejected under 35 U.S.C. 102(a) as anticipated by Ao (6,987,683) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lin (5,422,838).

Regarding to claim 17, Ao discloses a content addressable memory comprising: at least one group of MCAM cells (10), each MCAM cell comprising a data memory for storing a bit of data word (11), and a magnitude comparator (13 or 100 or 166) for comparing the bit of the data word (output of 9) to a corresponding bit of a comparison word (output of 7); a plurality of comparison bit lines (A0-A4), one for each MCAM cell in the group of MCAM cells, for supplying bits of the comparison word to the MCAM cells, wherein the magnitude comparators (13 or 100) of the MCAM cells are connected in a series arrangement and are operable to produce a first magnitude signal indicating whether the comparison word is greater than the data word and a second magnitude signal indicating whether the comparison word is less than the data word. *See at least Figs. 1-3; for example Cols. 5-8; lines 58-67, 1-67, 1-67; 1-38, respectively, and the related disclosure.*

Regarding to claim 19, Ao further disclose wherein the at least one group of MCAM cells include a first MCAM cell group (9, 15) for storing a first sub-word (11 or 17) of the data word and a second MCAM cell group (19, 23, 31) for storing a second sub-word of the data word (20 or 25 or 31) and further comprising a second stage comparator (199), responsive to the first and second magnitude signals (193, 195) and the first MCAM cell group and the first and second magnitude signals (187, 189) and the second MCAM cell group. *See at least Fig 3; for example Col. 7, lines 31-51 and the related disclosure.*

Regarding to claim 36, Ao discloses a content addressable memory comprising: at least one group of MCAM cells (10), each MCAM cell comprising a data memory for storing a bit of data word (11), and a magnitude comparator (13 or 100 or 166) operated to generate an output magnitude signal in response to the bit of the data word (output of 9); a corresponding bit of comparison word (output of 7), and an input magnitude signal (193 or 195); a plurality of comparison bit lines (A0-A4), one for each MCAM cell in the group of MCAM cells, for supplying bits of the comparison word to the MCAM cells, wherein the magnitude comparators of the MCAM cells are connected in a series arrangement, such that the output magnitude of an MCAM cell magnitude comparator in series arrangement is provided as the input magnitude signal to a subsequent MCAM magnitude comparator in the series arrangement, and wherein the output magnitude signal is asserted if the comparison value is greater than the value (171, 177, 183, 189, 195) or if the comparison value is equal to the data value and the input magnitude signal is asserted (output of 201). *See at least Figs. 1-3; for example Cols. 5-8; lines 58-67, 1-67, 1-67; 1-38, respectively, and the related disclosure.*

Ao discloses the claimed invention as noted above (claims 17, 19 and 36) but fail to specify a word line for the group of MCAM cells; a plurality of data bit lines, one for each MCAM cell in the group of MCAM cells, for supplying bits of the data word to the MCAM cells.

Lin disclose a content addressable memory comprising a word line (77) for one group of CAM cells (61 or 62); a plurality of data bit lines (BL, /BL), one for each MCAM cell in the group of MCAM cells, for supplying bits of the data word to the MCAM cells.

It would have been inherently included the above noted word line, data bit lines in a Ao's MCAM, if not, it would have been obvious to form Ao's MCAM with a word line for the group of MCAM cells and a plurality of data bit lines, one for each MCAM cell in the group of MCAM cells, for supplying bits of the data word to the MCAM cells as taught by Lin in order to provide fast, efficiency, reliable data storage and retrieval in the MCAM device. *See at least Figs. 8-9; for example of Cols. 9-11, lines 17-68, 1-68, 1-68, respectively.*

Allowable Subject Matter

6. Claims 2-8, 10-13, 16, 18, 20, 32-33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record fails to teach the MCAM as noted above (claim 1) and further include the limitations of claims 2, 9; the MCAM as noted above (claim 17) and further include the

limitations of claim 18; the MCAM as noted above (claim 31) and further include the limitations of claim 32.

7. The following is an examiner's statement of reasons for allowance: Claims 21-30 are allowable over the prior art of record because none of the prior art whether taken singularly or in combination, especially when these limitations are considered within the specific combination claimed, to teach: Method of comparing of MCAM cells comprising step if the bit of the comparison word matches the bit of the data word: outputting the first magnitude signal of the preceding MCAM cell as the first magnitude signal of the current MCAM cell, and among other steps as claimed in independent claim 21.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lam whose telephone number is (571) 272-1782. The examiner can normally be reached on 6:00 – 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zarabian Amir can be reached on (571) 272-1852. The fax phone numbers for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

Art Unit: 2827

system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D. Lam

February 17, 2006



DAVID LAM
PRIMARY EXAMINER